Models

Setup

```
colleges <- read_csv(paste0("https://raw.githubusercontent.com/",
                            "ayakkala1/final-stat-334/",
                            "master/data/USNews.csv"))

colleges <- colleges %>%
              drop_na()

head(colleges)
```

```
## # A tibble: 6 x 16
##   Name  State Funding  Apps Accepted Enrolled Top10  FTUG Tuition RmBrd
##   <chr> <chr> <chr>   <dbl>    <dbl>    <dbl> <dbl> <dbl>   <dbl> <dbl>
## 1 Alas~ AK    Private   193      146       55    16   249    7560  4120
## 2 Univ~ AL    Public   1351      892      570    18  2385    4440  3030
## 3 Aubu~ AL    Public   7548     6791     3070    25 16262    6300  3933
## 4 Birm~ AL    Private   805      588      287    67  1376   11660  4325
## 5 Hunt~ AL    Private   608      520      127    26   538    8080  3920
## 6 Juds~ AL    Private   313      228      137    10   552    5780  3600
## # ... with 6 more variables: PhD <dbl>, SFRatio <dbl>, Alumni <dbl>,
## #   Spending <dbl>, Gradrate <dbl>, StdScore <dbl>
```

Model Information

Response: **GradRate** (in percent of students who graduate within 6 years)

Variables for USNews Data

1. College name
2. State (postal code)
3. Funding (categorical variable: Public or Private)
4. Number of applications received (in number of students)
5. Number of applicants accepted (in number of students)
6. Number of new students enrolled (in number of students)
7. Pct. new students from top 10% of H.S. class (in percent)
8. Number of fulltime undergraduates (in number of students)
9. Out-of-state tuition (in dollars)
10. Room and board costs (in dollars)
11. Pct. of faculty with Ph.D.'s (in percent)
12. Student/facultyratio (instudents per faculty member)
13. Pct.alumni who donate (in percent)
14. Instructionalexpenditureperstudent (in dollars)
15. Graduation rate (in percent of students who graduate within 6 years)
16. StdScore = the average of standardized SAT and ACT scores for students at the school (in standard deviations above or below average)

Missing values are denoted with *

Model 1

```
explanatory <- names(colleges)[names(colleges) != "Gradrate"]

model1 <- lm(Gradrate ~ Funding + Apps + Accepted +
                        Enrolled + Top10 + FTUG +
                        Tuition + RmBrd + PhD +
                        SFRatio + Alumni + Spending + StdScore,
             data = colleges)

summary(model1)
```

```
##
## Call:
## lm(formula = Gradrate ~ Funding + Apps + Accepted + Enrolled +
##     Top10 + FTUG + Tuition + RmBrd + PhD + SFRatio + Alumni +
##     Spending + StdScore, data = colleges)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -45.387  -8.336  -0.463   8.057  57.904
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)   45.9215420  4.5692416  10.050  < 2e-16 ***
## FundingPublic -6.0696211  1.8354165  -3.307 0.000994 ***
## Apps           0.0010361  0.0004774   2.170 0.030329 *
## Accepted      -0.0003045  0.0008999  -0.338 0.735151
## Enrolled       0.0022294  0.0023993   0.929 0.353110
## Top10          0.0676452  0.0494678   1.367 0.171941
## FTUG          -0.0007830  0.0004229  -1.851 0.064548 .
## Tuition        0.0007703  0.0002575   2.992 0.002874 **
## RmBrd          0.0020690  0.0006229   3.322 0.000944 ***
## PhD           -0.0172452  0.0413894  -0.417 0.677062
## SFRatio        0.0509851  0.1634021   0.312 0.755121
## Alumni         0.2397559  0.0522030   4.593 5.23e-06 ***
## Spending      -0.0006260  0.0001581  -3.960 8.30e-05 ***
## StdScore       5.3830684  1.0080426   5.340 1.27e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12.91 on 669 degrees of freedom
## Multiple R-squared:  0.4422, Adjusted R-squared:  0.4314
## F-statistic:  40.8 on 13 and 669 DF,  p-value: < 2.2e-16
```

% latex table generated in R 3.5.3 by xtable 1.8-4 package % Thu May 16 22:08:38 2019

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	45.9215	4.5692	10.05	0.0000
FundingPublic	-6.0696	1.8354	-3.31	0.0010
Apps	0.0010	0.0005	2.17	0.0303
Accepted	-0.0003	0.0009	-0.34	0.7352
Enrolled	0.0022	0.0024	0.93	0.3531
Top10	0.0676	0.0495	1.37	0.1719
FTUG	-0.0008	0.0004	-1.85	0.0645
Tuition	0.0008	0.0003	2.99	0.0029
RmBrd	0.0021	0.0006	3.32	0.0009
PhD	-0.0172	0.0414	-0.42	0.6771
SFRatio	0.0510	0.1634	0.31	0.7551
Alumni	0.2398	0.0522	4.59	0.0000
Spending	-0.0006	0.0002	-3.96	0.0001
StdScore	5.3831	1.0080	5.34	0.0000